

REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 322 POWER PLANT OPERATIONS

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MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS

REGULATION III - CONTROL OF AIR CONTAMINANTS
RULE 322

POWER PLANT OPERATIONS

SECTION 100 - GENERAL

- 101 PURPOSE:** To limit the discharge of nitrogen oxides, sulfur oxides, particulate matter and carbon monoxide emissions into the atmosphere from stationary fossil-fuel-fired equipment at existing power plants and existing cogeneration plants and to limit particulate matter emissions from cooling towers associated with this equipment.
- 102 APPLICABILITY:** This rule applies to any of the following types of equipment that burn fossil fuel for which construction commenced prior to May 10, 1996:
- 102.1** Each electric utility steam generating unit or cogeneration steam generating unit used to generate electric power that has a heat input of equal to or greater than 100 million (MM) Btu/hour (29 megawatts (MW)).
- 102.2** Each electric utility stationary gas turbine with a heat input at peak load equal to or greater than 10 MMBtu/hour (2.9 MW) based upon the lower heating value of the fuel.
- 102.3** Each cooling tower associated with the type of equipment listed in subsections 102.1 and 102.2.
- 103 EXEMPTIONS:** This rule shall not apply to the following types of equipment:
- 103.1** Combustion equipment associated with nuclear power plant operations;
or
- 103.2** Reciprocating internal combustion equipment.
- 104 PARTIAL EXEMPTIONS:**

104.1 Stationary gas turbines that meet any of the following criteria listed below are exempt from Sections 304 and 305 and subsections 301.1, 306.4, 401.4, and 501.4 of this rule:

- a. Used for fire fighting; or
- b. Used for flood control; or
- c. Used in the military at military training facilities or military gas turbines for use in other than a garrison; or
- d. Engaged by manufacturers in research and development of equipment for either gas turbine emission control techniques or gas turbine efficiency improvements.

104.2 All equipment listed in Section 102 fired with an emergency fuel that is normally fired with natural gas is exempt from Sections 304 and 305 and subsections 301.1, 306.4, 401.4, and 501.4 of this rule.

104.3 All equipment listed in Section 102 shall be exempt from Sections 304 and 305 and subsections 301.1, 306.4, 401.4, and 501.4 of this rule for 36 cumulative hrs. of firing emergency fuel per year, per unit for testing, reliability, training, and maintenance purposes.

SECTION 200 - DEFINITIONS: For the purpose of this rule, the following definitions shall apply: See Rule 100 (General Provisions and Definitions) of these rules for definitions of terms that are used but not specifically defined in this rule.

- 201 COGENERATION STEAM GENERATING UNIT** – A steam or hot water generating unit that simultaneously produces both electrical (or mechanical) and thermal energy (such as heat or steam) from the same primary energy source and supplies more than one-third of its potential electric output to any utility power distribution system for sale.
- 202 COMBINED CYCLE GAS TURBINE** – A type of stationary gas turbine wherein heat from the turbine exhaust is recovered by a steam generating unit to make steam for use in a steam-electric turbine.
- 203 CONTINUOUS EMISSION MONITORING SYSTEM (CEMS)** – The total equipment required to sample and analyze emissions or process parameters such as opacity, nitrogen oxide, and oxygen or carbon dioxide, and to provide a permanent data record.
- 204 COOLING TOWERS** – Open water recirculating devices that use fans or natural draft to draw or force air through the device to cool water by evaporation and direct contact.

- 205 CORRECTIVE ACTION PLAN (CAP)** - A methodical procedure that is used to evaluate and correct a turbine operational problem and that includes, at a minimum, improved preventative maintenance procedures, improved ECS operating practices, possible operational changes, and progress reports.
- 206 DISTILLATE OIL** – A petroleum fraction of fuel oil produced by distillation that complies with the specifications for fuel oil numbers 1 or 2, as defined by the American Society for Testing and Materials in ASTM D396-01, "Standard Specification for Fuel Oils."
- 207 DRIFT** – Water droplets, bubbles, and particulate matter that escape from cooling tower stacks.
- 208 DRIFT ELIMINATOR** – Device used to remove drift from cooling tower exhaust air, thus reducing water loss by relying on rapid changes in velocity and direction of air-droplet mixtures by impaction on eliminator passage surfaces. A drift eliminator is not categorized as an emission control system but is an inherent part of the cooling tower's design requirements.
- 209 DRIFT RATE** – Percentage (%) of circulating water flow rate that passes through a drift eliminator on a cooling tower.
- 210 ELECTRIC UTILITY STATIONARY GAS TURBINE** – Any stationary gas turbine that is constructed for the purpose of supplying more than 1/3 of its potential electric output capacity to any utility power distribution system for sale. Both simple and combined cycle gas turbines are types of electric utility stationary gas turbines.
- 211 ELECTRIC UTILITY STEAM GENERATING UNIT** – Any steam electric generating unit that uses fossil fuel and is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electric output to any utility power distribution system for sale.
- 212 EMERGENCY FUEL** - Fuel fired only during circumstances such as natural gas emergency, natural gas curtailment, or breakdown of delivery system such as an unavoidable interruption of supply that makes it impossible to fire natural gas in the unit. Fuel is not considered emergency fuel if it is used to avoid either peak demand charges or high gas prices during on-peak price periods or due to a voluntary reduction in natural gas usage by the power company.
- 213 EMISSION CONTROL SYSTEM (ECS)**– A system approved in writing by the Control Officer, designed and operated in accordance with good engineering practice to reduce emissions.
- 214 FOSSIL FUEL** – Naturally occurring carbonaceous substances from the ground such as natural gas, petroleum, coal and any form of solid, liquid, or gaseous fuel derived from such material for the purpose of creating energy.

- 215 FUEL SWITCHING STARTUP PROCESS** – The act of changing from one type of fuel to a different type of fuel.
- 216 HEAT INPUT** – Heat derived from the combustion of fuel, not including the heat input from preheated combustion air, recirculated flue gases, or exhaust gases from other sources, such as gas turbines, internal combustion engines, and kilns.
- 217 HIGHER HEATING VALUE (HHV) or GROSS HEATING VALUE** – The amount of heat produced by the complete combustion of a unit quantity of fuel determined by a calorimeter wherein the combustion products are cooled to the temperature existing before combustion and all of the water vapor is condensed to liquid.
- 218 LOW SULFUR OIL** – Fuel oil containing less than or equal to 0.05 % by weight of sulfur.
- 219 LOWER HEATING VALUE (LHV) OR NET HEATING VALUE** – The amount of heat produced by the complete combustion of a unit quantity of fuel determined by a calorimeter wherein the combustion products are cooled to the temperature existing before combustion and all of the water vapor remains as vapor and is not condensed to a liquid. The value is computed from the higher heating value by subtracting the water originally present as moisture and the water formed by combustion of the fuel.
- 220 NATURAL GAS CURTAILMENT** - An interruption in natural gas service, such that the daily fuel needs of a combustion unit cannot be met with natural gas available due to one of the following reasons, beyond the control of the owner or operator:
- 220.1** An unforeseeable failure or malfunction, not resulting from an intentional act or omission that the governing state, federal or local agency finds to be due to an act of gross negligence on the part of the owner or operator; or
 - 220.2** A natural disaster; or
 - 220.3** The natural gas is curtailed pursuant to governing state, federal or local agency rules or orders; or
 - 220.4** The serving natural gas supplier provides notice to the owner or operator that, with forecasted natural gas supplies and demands, natural gas service is expected to be curtailed pursuant to governing state, federal or local agency rules or orders.

- 221 NITROGEN OXIDES (NO_x)** – Oxides of nitrogen calculated as equivalent nitrogen dioxide.
- 222 OPACITY** – A condition of the ambient air, or any part thereof, in which an air contaminant partially or wholly obscures the view of an observer.
- 223 PARTICULATE MATTER EMISSIONS** – Any and all particulate matter emitted to the ambient air as measured by applicable state and federal test methods.
- 224 PEAK LOAD** – 100% of the manufacturer's design capacity of a gas turbine at 288° Kelvin, 60% relative humidity, and 101.3 kilopascals pressure (ISO standard day conditions).
- 225 POWER PLANT OPERATION** – An operation whose purpose is to supply more than one-third of its potential electric output capacity to any utility power distribution system for sale.
- 226 RATED HEAT INPUT CAPACITY** – The heat input capacity in million Btu/hr. a specified on the nameplate of the combustion unit. If the combustion unit has been altered or modified such that its maximum heat input is different than the heat input capacity on the name plate, the maximum heat input shall be considered the rated heat input capacity.
- 227 REGENERATIVE CYCLE GAS TURBINE** – Any stationary gas turbine that recovers thermal energy from the exhaust gases and utilizes the thermal energy to preheat air prior to entering the combustion unit.
- 228 RESIDUAL OIL** – The heavier oils that remain after the distillate oils and lighter hydrocarbons are distilled off in refinery operations. This includes crude oil or fuel oil numbers 1 and 2 that have a nitrogen content greater than 0.05 % by weight, and all fuel oil numbers 4, 5, and 6, as defined by the American Society of Testing and Materials in ASTM D396-01, "Standard Specifications for Fuel Oils."
- 229 SIMPLE CYCLE GAS TURBINE** – Any stationary gas turbine that does not recover heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine, or that does not recover heat from the gas turbine exhaust gases to heat water or generate steam.
- 230 STATIONARY GAS TURBINE** – Any simple cycle gas turbine, regenerative gas turbine or any gas turbine portion of a combined cycle gas turbine that is not self propelled or that is attached to a foundation.
- 231 SULFUR OXIDES (SO_x)** – The sum of the oxides of sulfur emitted from the flue gas from a combustion unit that are directly dependent upon the amount of sulfur in the fuel used.

- 232 THIRTY DAY (30) ROLLING AVERAGE** – An arithmetic mean or average of all hourly emission rates for 30 successive combustion equipment operating days and calculated by a CEMS every hour.
- 233 THREE (3) HOUR ROLLING AVERAGE** – An arithmetic mean or average of the 180 most recent 1-minute average values calculated by a CEMS every minute.
- 234 TOTAL DISSOLVED SOLIDS (TDS)** – The amount of concentrated matter reported in milligrams/liter (mg/l) or parts per million (ppm) left after filtration of a well-mixed sample through a standard glass fiber filter. The filtrate is evaporated to dryness in a weighed dish and dried to constant weight at 180° C and the increase in dish weight represents the total dissolved solids.
- 235 UNCOMBINED WATER** – Condensed water containing no more than analytical amounts of other chemical elements or compounds.

SECTION 300 – STANDARDS

301 LIMITATIONS – PARTICULATE MATTER:

- 301.1 Fuel Type:** An owner or operator of any combustion equipment listed in Section 102 shall burn only natural gas except when firing emergency fuel per subsection 104.2 and 104.3 of this rule. An owner or operator may burn a fuel other than natural gas for non-emergency purposes providing that the fuel shall not cause to be discharged more than 0.007 lbs. of particulate matter per MMBtu ~~heat input~~, demonstrated and documented through performance testing of this alternate fuel. This usage of different fuels other than natural gas shall be approved by the Control Officer prior to usage.
- 301.2 Good Combustion Practices:** An owner or operator of any stationary gas turbine listed in subsection 102.2, regardless of fuel type, shall use operational practices recommended by the manufacturer and parametric monitoring to ensure good combustion control. In lieu of a manufacturers' recommended procedure to ensure good combustion practices, one of the following procedures may be used:
- a. Monitor the maximum temperature differential across the combustion burners or at locations around the back end of the turbine, dependent upon the particular unit, to ensure no more than a 100°F difference using a thermocouple. If a valid maximum temperature differential of greater than 100°F is observed across the burners, investigation and corrective action shall be taken within three hours to reduce the temperature difference to 100°F or less; or

- b. If the manufacturer recommends that the maximum numerical temperature differential to ensure good combustion is a temperature that is greater than 100°F, then proof of this maximum alternate temperature shall be submitted to the Control Officer. The procedure to measure the maximum temperature differential listed above in subsection 301.2a shall then be followed using the alternate recommended maximum temperature differential after approval by the Control Officer.
- c. If the frequency of failure to meet the proper temperature differential of 100°F or to meet the alternate temperature differential recommended by the manufacturer reflects a pattern that the turbine is not being operated in a manner consistent with good combustion practices, then the Control Officer may require the owner or operator to submit a Corrective Action Plan (CAP).

301.3 Cooling Towers: An owner or operator of a cooling tower associated with applicable units listed in Section 102 shall:

- a. Equip the cooling tower with a drift eliminator. The drift eliminator shall not be manufactured out of wood and.
- b. The concentration of Total Dissolved Solids (TDS) multiplied by the percentage of drift rate shall not exceed the maximum numerical limit of 20.
- c. Visually inspect the drift eliminator on a monthly basis only if the drift eliminator can be viewed safely and does not require an owner or operator to walk into the tower. If the drift eliminator cannot be safely inspected monthly then subsection 301.3d shall apply:
- d. Visually inspect the drift eliminator for integrity during a regularly scheduled outage when the cooling tower is not operating if it cannot be inspected on a monthly basis. This visual inspection shall be no less than once per year.

302 LIMITATIONS – OPACITY:

- 302.1** No person shall discharge into the ambient air from any single source of emissions any air contaminant, other than uncombined water, in excess of 20% opacity, except as provided in subsection 302.2.
- 302.2** Opacity may exceed the applicable limits established in subsection 302.1 for up to one hour during the start up of switching fuels; however, opacity shall not exceed 40 % for any six (6) minute averaging period in this one hour period, provided the Control Officer finds that the owner or operator has, to the extent practicable, maintained and operated the

source of emissions in a manner consistent with good air pollution control practices for minimizing emissions. The one hour period shall begin at the moment of startup of fuel switching.

302.3 Determination of whether good air pollution control practices are being used shall be based on information provided to the Control Officer upon request, which may include, but is not limited to, the following:

- a. Monitoring results.
- b. Opacity observations.
- c. Review of operating and maintenance procedures.
- d. Inspection of the source.

303 LIMITATIONS - SULFUR IN FUEL: An owner or operator of any applicable equipment listed in Section 102 that burns fuel oil alone or in combo with any other fuel as either emergency fuel or non-emergency fuel that meets the standards in subsection 301.1 shall use only low sulfur oil with one exception. Existing supplies in storage of any fuel oil and/or of any used fuel oil with sulfur content greater than 0.05% by weight may be used by the owner or operator until (1.5 years after adoption of rule) for emergency fuel. This usage shall be reported within 24 hours to the Control Officer, verbally along with the dates of usage. A written report shall follow within 48 hrs. of usage which shall include identification of the nature of the emergency and actual and expected dates of usage.

304 LIMITATIONS – NITROGEN OXIDES: No owner or operator of any applicable equipment listed in subsection 102.1 that commenced construction or a major modification after May 30, 1972 shall cause to be discharged into the atmosphere nitrogen oxides in excess of the following limits:

304.1 155 ppmv ~~heat input~~, calculated as nitrogen dioxide when burning gaseous fossil fuel. During steady state operations, this test result using EPA Reference Method(s) 7, shall be based upon the arithmetic mean of the results of three test runs. Each test run shall have a minimum sample time of one hour. If a Continuous Emission Monitoring System (CEMS) is used, the test result shall be based upon a 30-day rolling average.

304.2 230 ppmv ~~heat input~~ calculated as nitrogen dioxide when burning liquid fossil fuel. During steady state operations, this test result using EPA Reference Method(s) 7, shall be based upon the arithmetic mean of the results of three test runs. Each test run shall have a minimum sample time of one hour. If a CEMS is used, the test result shall be based upon a 30-day rolling average.

305 LIMITATIONS - CARBON MONOXIDE: No owner or operator of any equipment listed in Section 102 shall cause to be discharged into the atmosphere carbon monoxide (CO) measured in excess of 400 ppmv during steady state compliance source testing. This test result, using EPA Reference Method 10, shall be based upon the arithmetic mean of the results of three test runs. Each test run shall have a minimum sample time of one hour. The CO concentration shall be measured dry and corrected to 3% oxygen for electric utility steam generating units and cogeneration steam generating units. The CO concentration shall be measured dry and corrected to 15% oxygen for stationary gas turbines.

306 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT:

306.1 Emission Control System Required: For affected operations which may exceed any of the applicable standards set forth in Section 300 of this rule, an owner or operator may comply by installing and operating an emission control system (ECS).

306.2 Providing and Maintaining ECS Monitoring Devices: No owner or operator required to use an approved ECS pursuant to this rule shall do so without first properly installing, operating, and maintaining in calibration and in good working order, devices for indicating temperatures, pressures, transfer rates, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained as described in an approved O&M Plan.

306.3 Operation and Maintenance (O&M) Plan Required For ECS:

- a. General Requirements:** An owner or operator shall provide and maintain an O&M Plan for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule or to an air pollution permit.
- b. Approval by Control Officer:** An owner or operator shall submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used pursuant to this rule.
- c. Initial Plans:** An owner or operator that is required to have an O&M Plan pursuant to this rule shall comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified by the Control Officer in writing. Once the initial plan has been approved in writing by the Control Officer, an owner or operator shall then comply with the approved plan.

- d. **Revisions to Plan:** If revisions to the initial plan have been approved by the Control Officer in writing, an owner or operator shall comply with the revisions to the initial plan.
- e. **Control Officer Modifications to Plan:** After discussion with the owner or operator, the Control Officer may modify the plan in writing prior to approval of the initial O & M plan. An owner or operator shall then comply with the plan that has been modified by the Control Officer.

306.4 Continuous Emission Monitoring Systems (CEMS):

- a. An owner or operator of a combustion unit subject to Section 304 with a heat input of greater than 250 MMBtu/hr, regardless of fuel type, shall install, calibrate, maintain, and operate a CEMS for measuring nitrogen oxides and recording the output of the system. Where nitrogen oxide emissions are monitored by a CEMS, then a CEMS shall also be required for the measurement of the oxygen content of the flue gases. All CEMS shall comply with the provisions in 40 CFR Subpart Da, Part 60, 60.47 (a).
- b. An owner or operator of any affected unit listed above that requires a CEMS for nitrogen oxides that meets and is continuing to meet the requirements of 40 CFR Part 75 may use that CEMS to meet the requirements of subsection 306.4a of this rule.

- 307 EMERGENCY FUEL USE NOTIFICATION** – An owner or operator of a unit that uses emergency fuel that is normally fired with natural gas shall notify the Control Officer verbally no later than 24 hours after declaration of the emergency that necessitates its use per subsection 104.2. This verbal report shall be followed by a written report within 48 hrs. of initial usage which shall also include identification of the nature of the emergency, initial dates of usage, and the expected dates of usage.

SECTION 400 - ADMINISTRATIVE REQUIREMENTS

401 COMPLIANCE SCHEDULE

401.1 Operation and Maintenance (O&M) Plan: Any owner or operator employing an approved ECS on the effective date of this rule shall by (insert 8 mos. after rule is adopted) file an O&M Plan with the Control Officer in accordance with subsection 306.3 of this rule.

401.2 Modifications to Existing ECS: Any owner or operator required to modify their ECS equipment or system by either reconstructing or adding on new equipment for compliance with this rule shall by (insert 6 months after rule is adopted) file a schedule for the modification with the Control

Officer. The plan shall show how the ECS is to be used to achieve full compliance and shall specify dates for completing increments of progress. Any and all ECS(s) used to achieve such compliance shall be in operation by (insert 30 months after date of adoption of rule).

401.3 ECS Installation: An owner or operator required to install a new ECS to satisfy the requirements of this rule shall file a schedule for the installation of an ECS by (insert 8 months after the rule is adopted). The plan shall show how the ECS is to be used to achieve full compliance and shall specify dates for completing increments of progress. Any and all ECS(s) used to achieve such compliance shall be in operation by (insert 36 months after adoption of rule).

401.4 CEMS Installation: An owner or operator required to install or modify a CEMS to satisfy the requirements of this rule shall file a schedule for the installation or modification of the CEMS by (insert 8 months after the rule is adopted) and complete the installation of the CEMS by (insert 36 months after date of adoption of rule).

SECTION 500 - MONITORING AND RECORDS

501 RECORDKEEPING AND REPORTING: Any owner or operator subject to this rule shall comply with the requirements set forth in this section. Any records and data required by this section shall be kept on site at all times in a consistent and complete manner and be made available without delay to the Control Officer or his designee upon request. Records shall consist of the following information:

501.1 Equipment Listed in Section 102: Type of fuel used, amount of fuel used, amount of sulfur in the fuel if using liquid fuel, and the days and hours of operation.

501.2 Cooling Towers: Monthly gravimetric testing reports for TDS shall be recorded for six months in succession and thereafter quarterly reports shall be recorded. Results of the monthly or yearly visual inspection of the drift eliminator shall also be recorded. If the drift eliminator cannot be visually inspected monthly, then documentation of the physical configuration of the drift eliminator shall be submitted to the Control Officer to demonstrate that the drift eliminator cannot be inspected monthly.

501.3 Emergency Fuel Usage: Type and amount of emergency fuel used, dates and hours of operation using emergency fuel, nature of the emergency or reason for the use of emergency fuel as stated in subsections 104.2 and 104.3.

501.4 Fuel Switching: Duration of fuel switch including stop and start times and monthly totals for twelve-month log of hours of operation for testing, reliability, and maintenance purposes per subsection 302.2.

501.5 CEMS: All CEMS measurements, results of CEMS performance evaluations, CEMS calibration checks, and adjustments and maintenance performed on these systems.

501.6 Good Combustion Practices: Measurements of the temperature differential across the burners of turbines per subsection 301.2, results of evaluation and of corrective action taken to reduce the temperature differential or a finding that the temperature differential returned to the range listed in subsection 301.2 a or b without any action by the owner or operator.

502 RECORDS RETENTION: Copies of reports, logs, and supporting documentation required by the Control Officer shall be retained for at least 5 years. Records and information required by this rule shall also be retained for at least 5 years.

503 COMPLIANCE DETERMINATION:

503.1 Low Sulfur Oil Verification:

- a. An owner or operator shall submit fuel oil or liquid fuel receipts from the fuel supplier indicating the sulfur content of the fuel or verification that the oil used to generate electric power meets the 0.05% sulfur limit if requested by the Control Officer; or
- b. If fuel receipts are not available then an owner or operator shall submit a statement of certification or proof of the sulfur content of the oil or liquid fuel from the supplier to the Control Officer; or
- c. An owner or operator may elect to test the fuel for sulfur content in lieu of certification from the fuel supplier or fuel receipts.

503.2 Drift Rate Verification: An owner or operator shall submit design drift rate verification from the manufacturer of the drift eliminator used in the cooling towers to the Control Officer if proof of the design drift rate is requested by the Control Officer.

504 TEST METHODS ADOPTED BY REFERENCE: The EPA test methods as they exist in the Code of Federal Regulations (CFR) (July 1, 2001), as listed below, are adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this Section are available at the Maricopa County Environmental Services Department, 1001 N. Central Avenue, Phoenix, AZ 85004-1942. The ASTM methods (1990, 1998 and 2000) and the Standard Methods listed below (1995) are also adopted by reference.

When more than one test method as listed in subsections 504.10 through 504.13 is permitted for the same determination, an exceedance of the limits established in this rule determined by any of the applicable test methods constitutes a violation.

- 504.1** EPA Reference Methods 1 ("Sample and Velocity Traverses for Stationary Sources"), and 1A ("Sample and Velocity Traverses for Stationary Sources with Small Stacks and Ducts") (40 CFR 60, Appendix A).
- 504.2** EPA Reference Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2A ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2C ("Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts"), and 2D ("Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts") (40 CFR 60, Appendix A).
- 504.3** EPA Reference Methods 3 ("Gas Analysis for the Determination of Dry Molecular Weight"), 3A ("Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure)"), 3B ("Gas Analysis for the Determination of Emission Rate Correction Factor of Excess Air"), and 3C ("Determination of Carbon Dioxide, Methane, Nitrogen and Oxygen from Stationary Sources") (40 CFR 60, Appendix A).
- 504.4** EPA Reference Method 4 ("Determination of Moisture Content in Stack Gases") (40 CFR 60, Appendix A).
- 504.5** EPA Reference Method 5 ("Determination of Particulate Emissions from Stationary Sources") (40 CFR 60, Appendix A) and possibly, if requested by the Control Officer, EPA Reference Method 202 ("Determination of Condensable Particulate Emissions from Stationary Sources") (40 CFR 51, Appendix M).
- 504.6** EPA Reference Methods 7 ("Determination of Nitrogen Oxide Emissions from Stationary Sources"), 7A ("Determination of Nitrogen Oxide Emissions from Stationary Sources"), 7B ("Determination of Nitrogen Oxide Emissions from Stationary Sources - Ultraviolet Spectrometry"), 7C ("Determination of Nitrogen Oxide Emissions from Stationary Sources - Alkaline-Permanganate Colorimetric Method"), 7D ("Determination of Nitrogen Oxide Emissions from Stationary Sources - Alkaline-Permanganate Chromatographic Method"), and 7E ("Determination of Nitrogen Oxide Emissions from Stationary Sources - Instrumental Analyzer Method") (40 CFR 60, Appendix A).
- 504.7** EPA Reference Method 9 ("Visual Determination of the Opacity of Emissions from Stationary Sources") (40 CFR 60, Appendix A).

- 504.8** EPA Reference Method 10 ("Determination of Carbon Monoxide Emissions from Stationary Sources") (40 CFR 60, Appendix A).
- 504.9** EPA Reference Method 20 ("Determination of Nitrogen Oxides, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines") (40 CFR 60, Appendix A).
- 504.10** American Society of Testing Materials, ASTM Method ~~#D2622-98~~, ("Standard Test Method for Sulfur in Petroleum Products by Wavelength Disperse X-Ray Fluorescence Spectrometry"), 1998.
- 504.11** American Society of Testing Materials, ASTM Method #D1266-98, ("Standard Test Method for Sulfur in Petroleum Products - Lamp Method"), 1998.
- 504.12** American Society of Testing Materials, ASTM Method #D2880-00, ("Standard Specification for Gas Turbine Fuel Oils"), 2000.
- 504.13** American Society of Testing Materials, ASTM Method #D4294-90 or 98 ("Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry"), 1990 or 1998.
- 504.14** Standard Methods for the Examination of Water and Wastewater, ("Dissolved Solids Dried at 180°C, Method #2540C"), American Public Health Association, 19th edition, 1995.